

REMARKS

The Applicant appreciates the courteous and complete examination of the application by the Examiner. In view of the foregoing amendments and the following remarks, a reconsideration of the instant application is respectfully requested.

The Examiner rejects claims 1-12 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. Claims 1-5 and 10-12 have been amended to correct all indefiniteness and antecedent basis errors. Claims 6 and 7 believe to contain no informalities to the above-identified amended claims.

The Examiner rejects claims 1-4, 7-12 under 35 U.S.C. 103(a) as being unpatentable over British document (2161544) in view of Japanese document (60-215907) and British document (2080437).

In order to expedite the prosecution of this application, claims 8, and 9 have been canceled without prejudice or disclaimer of the subject matter thereof. Claims 1-5 and 10-12 have been amended to put them in condition for allowance under Rule 116.

The Applicant contests the Examiner's main argument for the rejection of claim 1 in that "It would have been considered obvious to one of ordinary skill in the art to modify British document '544 to include a roof with horizontal duct and turbine as taught by Japanese document '907 and a vertical duct connected to the room as taught by British document '437 in order to control the amount of power generated."

The Applicant would like to point out that the vertical tube connected to a room (15) in the document '437 actually serves for control, while the vertical duct 2 in the present invention does not serve at all for control. The difference between the function of the vertical duct 2 of the present invention and the function of the vertical duct of document '437 leads, necessarily, to some important differences in the overall configuration. First, in document '437 the room being connected to the vertical duct 15 has a lateral opening which connects the room (15) with the so called port (14) which is connected to the master column (11) which is connected to the sea. While in the present invention the room 3 being connected to the vertical duct 2 has no lateral opening. Second, in document '437 the vertical duct (15) having a control function has been placed at the lee side of the plant where the wave energy is smaller, while in the

present invention the vertical duct 2 having the function to absorb wave energy has been placed at the wave-beaten side of the plant, where the wave energy is greater.

The function of the vertical duct in document '437 can be expressed in that the port (14) and the vertical duct (15) containing the column (17) work as a valve, as can be appreciated by this quote from document '437 "As the column 17 rises, it closes a port 14 to retain the master column 11 stationary, but the port 14 re-opens as column 17 falls."

The present invention, as described in claim 1, discloses a U-shaped master column being contained in the vertical duct 2 and in the vertical room 3. Hence, the vertical duct 2 contains a part of the master column. This is substantially different from document '437, by that the master column of the present invention is not retained stationary by a valve-type device as mentioned above.

Conventional oscillating water columns (OWCs), including the prior art references relied upon by the Examiner, correspond to the general description that it is given in the Background art section. They consist of a vertical master column communicating with the sea through a lower opening. The eigenperiod of said vertical master column is typically smaller than the wave period, as it is explicitly pointed out in document '437. That is why, for increasing efficiency, some OWCs exploit a so called forced resonance obtained by means of some complex devices for phase control. An advanced example of said devices for phase control is that illustrated in the paper by Korde (1991) which is quoted in the Background art section. Another device for phase control is that disclosed by document '437, which consists of the vertical duct (15), the oscillating column (17), and the port (14).

It can be appreciated that the claimed present invention does not need devices for phase control. The U-shaped master column of the present invention has an eigenperiod greater than the eigenperiod of a vertical master column. The eigenperiod can be given the same value of the wave period, on making the width of the vertical duct 2 smaller than the width of the room 3. That is why the claimed present invention exploits a natural resonance and does not call for devices for a forced resonance, like the prior art references.

The Applicant would like to point out main difference between the claimed present invention and document '544 (Fig. 1). The Background art section quotes the paper by Takahashi et al. (1992) which illustrates an example of a caisson breakwater embodying a conventional OWC. One more example of a caisson breakwater embodying a conventional OWC is the one of Figure 1 of document '544. There is a crucial difference between the claimed caisson breakwater of the present invention and the caisson breakwaters of document '544 (Fig. 1) and of the paper by Takahashi et al. (1992). The claimed caisson breakwater of the present invention embodies a U-shaped master column, not a vertical master column like in the document '544 (Fig.1) and in the paper by Takahashi et al. (1992).

The idea of embodying a U-shaped master column into a caisson breakwater is valuable because it brings the following three benefits:

- i) the possibility to exploit a natural resonance;
- ii) the possibility to exploit a large amplitude of the wave pressure on the outer end of the master column; and
- iii) the possibility to get a high structural resistance.

As for benefit (ii), bear in mind that the amplitude of the wave pressure is reduced as the depth beneath the water surface grows. Note also that the upper opening 6, of the claimed present invention, of the master column can be positioned close to the water surface, without reducing the length of the master column (which implies reducing the eigenperiod. As for benefit (iii), note that the two vertical walls forming the vertical duct 2 are connected to each other by the partitioning walls 14, and note that said two vertical walls are rather close to each other, so that said two vertical walls give a high resistance to the caisson structure. Therefore, it would not have been obvious to modify the shape of the master column so as to obtain the three aforementioned benefits.

The Examiner makes specific reference to claims 2-4 as "it would have been obvious to one having ordinary skill in the art at the time the invention was made to include multiple vertical ducts, cells, air ducts, turbines, closing valves, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art." The Applicant believes that claims 3 and 4 are not mere

duplications of the essential working parts, since they introduce substantially different structural limitations that are not disclosed or taught in the prior art references.

Claim 3 has been amended to incorporate all the limitations of claim 1, and has therefore been changed to an independent claim. In response to the Examiners rejection, independent claim 3 contains "openings (15', 15", 15IV, 15V) defined in the walls (14', 14", 14"', 14IV, 14V)" for allowing the air to circulate through the cells (3', 3", 3"', 3IV, 3V, 3VI). These openings provide for unobstructed air distribution and circulation between all the cells. Claim 4, which depends on independent claim 1, introduces "cells (3', 3", 3"', 3IV, 3V, 3VI) being connected with the atmosphere through tubes (16', 16", 16"', 16IV, 16V, 16VI) which join with interposed distribution frames to said air-duct (4', 4")". As described above, claim 4 contains substantially different structural limitations that are not disclosed or taught by the prior art references relied upon by the Examiner. It can be appreciated that claims 3 and 4 do not merely introduce duplication of essential working parts of the device, but actually introduce structural elements that are not disclosed or taught by British documents '544 and '437, and Japanese document '907 which the Examiner relies upon for this rejection. The Applicant believes that claims 3 and 4 contain allowable subject matter.

Claim 10 has been amended to incorporate all the limitations of cancelled claim 8, and has therefore been changed to an independent claim. Independent claim 10 contains "openings (15', 15", 15IV, 15V) defined in the walls (14', 14", 14"', 14IV, 14V)" for allowing the air to circulate through the cells (3', 3", 3"', 3IV, 3V, 3VI). These openings provide for unobstructed air distribution and circulation between all the cells. The Applicant believes that claim 10 contains allowable subject matter.

Claim 11 contains structural limitations that are substantially different to any of the prior art references relied upon by the Examiner. British document '437 does disclose a vertical duct connected to a room (15), as mentioned by the Examiner, but it does not disclose or teach a separate duct connecting the vertical duct to the room that "is formed by positioning a material filled caisson cell between said vertical duct and said room, and which extends for all the width of said room and extends in height from said roof downwards without reaching the base of said room", as described in claim 11. The Applicant believes that claim 11 contains allowable subject matter.

Claim 12 contains structural limitations that are substantially different to any of the prior art references relied upon by the Examiner. The prior art documents '544, '437, and '907 do not disclose "cells (3', 3", 3'", 3IV, 3V, 3VI) being connected with the atmosphere through tubes (16', 16", 16'", 16IV, 16V, 16VI) which join to at least one air duct (4', 4")", as described in claim 12. The tubes are essential to the claimed invention and would not have been obvious to one skilled in the art since the prior art reference relied upon by the Examiner since they do not suggest the use of tubes to join subdivided cells.

Additionally, the Examiner rejects claims 1/6, 1/2/6, 1/3/6, and 1/4/6 under 35 U.S.C. 103(a) as being unpatentable over British document (2161544) in view of Japanese document (60-215907) and British document (2080437) as applied to claims 2-4, and further in view of British document (GB 2365385). The Applicant appreciates the Examiners efforts in locating a prior art reference disclosing an offshore structure having a cellular concrete base means supporting a number of wind turbines, and an oscillating water column systems. Claim 6 specifically discloses the "wind mills in the protected water-sheet behind said caisson breakwater." This specific location of the wind mills is not disclosed or taught by the '544 reference, and would not be obvious since there is no protected water-sheet behind the structure described in the '544 reference. The Applicant believes that claim 6 contains allowable subject matter by the above described structural limitation.

Lastly, the Examiner rejects claim 5 under 35 U.S.C. 103(a) as being unpatentable over British document (2161544) in view of Japanese document (60-215907) and British document (2080437) as applied to claim 1, and further in view of Japanese document (61-190172). Claim 5 has been amended to depend to claim 3.

First of all the Applicant requests that the Examiner reconsiders his rejections of the invention in view of the detailed reply to the main argument for the rejection of claim 1. As for claims 2 to 12 the Applicant requests that the well established principle that small differences in a crowded art can constitute patentable improvement. See *In re Baum*, 51 USPQ 470 (CCPA 1941) and *In re Lange*, 126 USPQ 365 (CCPA 1960). In considering this principle, the Applicant would also request that the Examiner take note to the court decision which notes that "apparent simplicity has been held to furnish

strong argument for patentability where, as here, a need has existed for a structure of the nature disclosed and claimed. The fact that a solution to a problem is simple, or appears to be simple when viewed in retrospect, does not mean that the solution was obvious when it was conceived.” See *Ellipse corp. v. Ford Motor Co.*, 171 USPQ 513.

Moreover, the law is clear that a motivation must be provided by the prior art to make the allegedly obvious combinations of parts relied upon in making an obviousness rejection.

Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. See, e.g., *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 140, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998). In re Dembiczak, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999).

And, absent such a showing of motivation in the prior art to make the allegedly obvious combination, it can only be assumed that the applicant's disclosure has provided the motivation for making the combination of elements from the prior art, and not the prior art itself.

Combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability -- the essence of hindsight. See e.g., *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed. Cir. 1985). In re Dembiczak, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999).

It is therefore submitted that the combination of individual parts taught by the various prior art references relied upon in the Office Action would not motivate one skilled in the art to arrive at the applicant's claimed invention.

With the above amendments being fully responsive to all outstanding rejections and formal requirements, it is respectfully submitted that the claims are now in condition for allowance, and a notice to that effect is earnestly solicited. Should the Examiner feel that there are further issues which might be resolved by means of telephone interview, the Examiner is cordially invited to telephone the undersigned at (403) 444-5695, or by email at davidguerra@verizon.net.

Respectfully Submitted,



David A. Guerra, Reg. 46,443

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to:

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

On (Date) July 27, 2006 by David A. Guerra 